



# Mounting OUTBOARDS

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## Right Way

How to set an engine  
on the transom and keep  
its propeller spinning.

By Michael Crowley

*Outboard technician Lincoln Davis warns that a good way to bring a fishing trip to an abrupt halt is to ignore even a short piece of pot warp around the propeller. It acts like a brake, burning up the prop hub and leaving you suddenly with no engine.*



**I**mproperly mounted outboards and burned-out propeller hubs can plague any boat owner. To help you avoid these situations, *National Fisherman* Boats & Gear Editor Michael Crowley went to outboard engine expert **Lincoln Davis** for some troubleshooting advice.

**NF:** *How much room for error do you have when setting an outboard up on the transom? Would a couple of inches one way or another make any difference?*

**LD:** Dramatically. If it's too high, there will be ventilation when you go through a corner. The propeller spins out; then the prop doesn't have any grip on the water, and the engine revs up. That's true going straight ahead, too. It's like having weeds in the propeller. What happens is, there's an area behind the propeller that needs good, solid water, but when the outboard is raised too high, you're reducing the area of solid water coming into the propeller. As the area is reduced, your pushing ability drops. At lower speeds, that's critical. When the engine is raised too high, you've essentially cut down the diameter of the propeller.

**NF:** *What about when the outboard is mounted too low?*

**LD:** If the engine is mounted too low, the drag is vastly increased, and the prop throws water into the back of the boat. Your mileage

is also dramatically reduced, and you could be slowed down as much as one-third. When I say too high or too low, I'm only talking about 1" or 2" in either direction.

**NF:** *How do you determine where the outboard is mounted?*

**LD:** New engines come with instructions on how to set them up, but if you have an engine without instructions, you'll want to end up with the outboard mounted at a 90-degree angle to the bottom of the boat, and the anti-ventilation plate, commonly called the cavitation plate, parallel to and even with the bottom of the boat.

You can't use the transom as a guide because it isn't at a 90-degree angle to the bottom of the boat. To get that angle, measure up from the bottom with a roofing square. (If you do measure along the transom, the engine will be mounted either too high or too low.)

Lay the short arm of the square along the bottom of the boat, which should be straight. The square's long arm then gives a vertical measurement up to the transom. Measure up the arm of the square the length of the out-

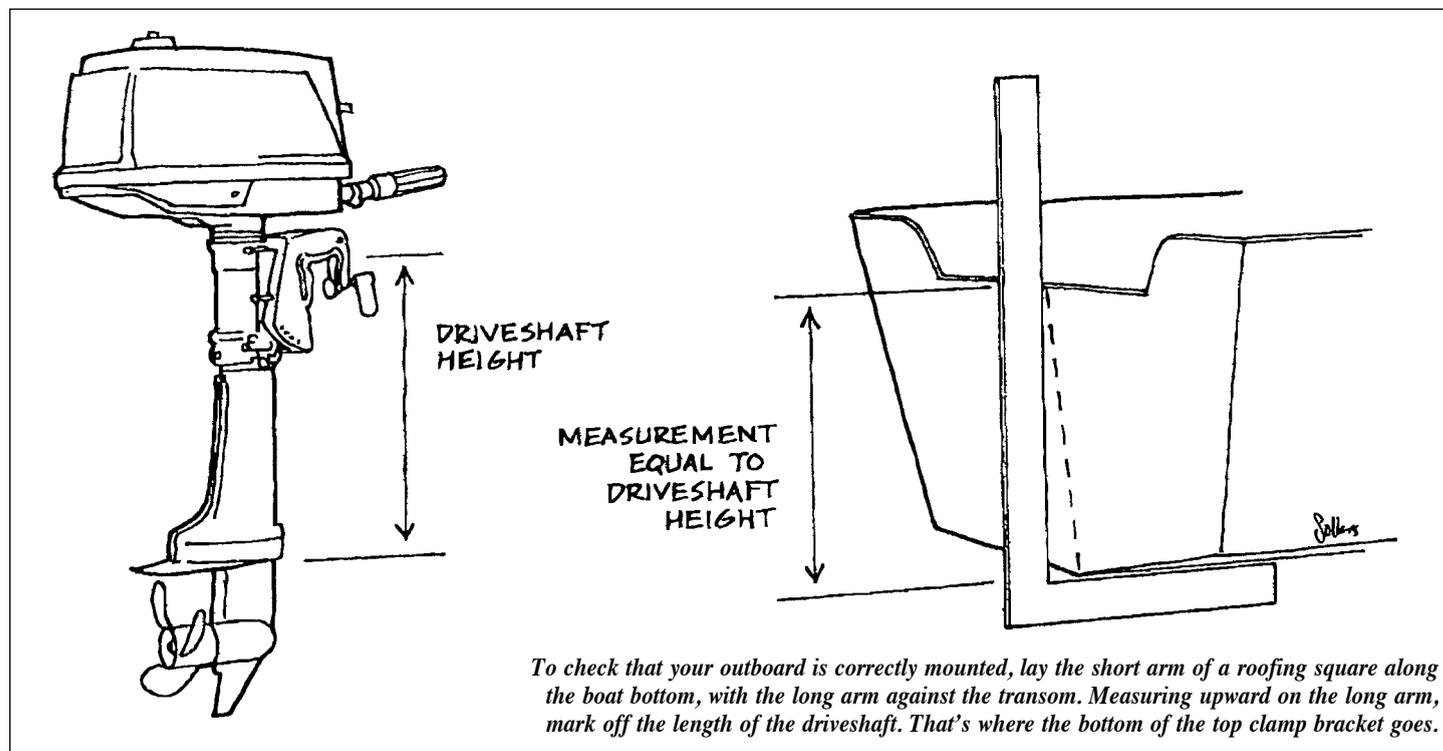
board's drive shaft, which is measured from the bottom side of the top clamp bracket to the bottom side of the cavitation plate.

In some cases, you may find that the outboard has to be mounted an inch or so above the transom. That's because boatbuilders build a transom any height they want, and rarely do they take into account the outboard that will be used. If your measurements are right, the cavitation plate will be parallel to and even with the bottom of the boat.

**NF:** *Do you have to use the roofing square in all cases?*

**LD:** Some small outboards you can just set on the back of the boat and adjust your tilt pin to get it parallel to the bottom; then lower or raise the outboard with shim sticks for the proper height. But you can't just set a large outboard on the transom. You have to use the square, because attaching the engine requires drilling holes in the transom. This applies only to boats that will be going less than 40 mph. At higher speeds, you'll need graphs and charts supplied by the manufacturer or dealer.

**NF:** *Does the height at which the outboard is mounted depend at all on what the boat will be used for? For instance, if you're going to be pulling a net or scallop drag, would the position of the outboard be different than if you're hauling lobster traps?*



**LD:** Under 40 mph, there's no difference. If you set the outboard lower or higher than it should be, you're going to have a lack of performance. At 40 mph and over, you would raise the engine on the transom. The

less of the lower unit you have in the water, the less drag you have and the faster you go.

But, at this speed, special propellers and very precise placement of the engine are required. Though this situation isn't of concern to the average fisherman.

**NF:** *On some boats, especially wooden boats, can't the keel be a problem?*

**LD:** That's very important. On some commercial wooden boats — which often have been homemade — there's a large keel on the bottom. The keel can dramatically effect the way the engine acts. The keel needs to be tapered. The taper should start 2' forward of the transom and go to nothing by the time it reaches the transom.

If this isn't done, the propeller receives bad water, and you'll have a ventilation situation whereby the engine is unable to effectively push the boat because there's too much air in the water.

**NF:** *Let's change the subject for a moment and talk about propellers. What's the most common propeller problem that you've seen on outboards used by commercial fishermen?*

**LD:** Burnt hubs. Fishermen get warp around the propeller, which slows down the prop and then burns out the rubber or plastic hub.

**NF:** *Is it that fishermen don't know they've got pot warp around the prop, or that they do but just keep running the engine?*

**LD:** Both. Fishermen call me up and say, "My engine just revs up and won't go anywhere." I ask them if it's still pumping water, and if it is, then the propeller hub is probably gone. The propeller might look fine from the outside, but internally the hub is gone.

When there's rope around the prop, you've got to stop immediately and clear the propeller. If you try to burn through it or ignore it because the rope has been cut, you'll ruin the hub.

**NF:** *Even if the rope has been cut through?*

**LD:** Even if it's cut. You have to remove it. It's like having a brake band around your propeller.

For instance, if a foot-long piece of rope gets jammed between the lower-unit housing and the propeller, it will act like a brake. The propeller is turning 99 revolutions, and the prop shaft is turning 100 revolutions; that slippage burns the hub out.

Sometimes it takes awhile to be noticed. It could be a week between the time rope

was wrapped around the prop and when the propeller lets go; suddenly, the engine revs up, and you've got no wheel. If you run it at one-third throttle, you might be able to limp back to port, but if you run the engine at anything more than that, it just spins out.

**NF:** *What about prop damage from hitting objects?*

**LD:** Damaged wheels aren't the problem they used to be. Wheels today will absorb a lot of damage before they stop functioning. The only problem is when outboards are run across the flats or shallows. Doing this continually grinds the prop down. As the prop's diameter is reduced, the engine's rpm start to climb, and some engines won't tolerate the increased speed.

**NF:** *Do you see many cases of fishermen using a prop of the wrong size?*

**LD:** Not usually. But sometimes outboard dealers aren't aware of the kinds of loads outboards carry, and the boat is fitted with a prop for a normal load. The dealer doesn't understand that sometimes the boats are carrying bait barrels and traps that can weigh hundreds of pounds.

A compromise is needed between a heavy load and light load. If you have a wheel with too much pitch, which is good for a light boat but not a loaded boat, you could have predetonation.

**NF:** *With an outboard, do you have much flexibility in adjusting a prop's pitch and diameter?*

**LD:** You have to stay within the manufacturer's recommended rpm levels. If you go too high, you can have vibration damage. If you go too low, the engine can have predetonation problems. In either case, you'll have a loss of performance.

**NF:** *What about multiblade propellers for commercial fishermen?*

**LD:** Most of the high-speed multiblade propellers are geared toward the bass-fishing market, and most of the commercial boats that I'm aware of don't fall into that category. So we're pretty much limited to three- and four-bladed wheels. □

**Lincoln Davis, a certified Mercury master mechanic, has owned Stetson & Pinkham Inc., an outboard motor and boat shop in Waldoboro, Maine, for 25 years. Earlier interviews with Davis appeared in Oct. '96, Feb. '95 and July '94 issues.**

## Port Kent 1/4 SQ